Your Career

MILWAUKEE SCHOOL OF ENGINEERING Bulletin

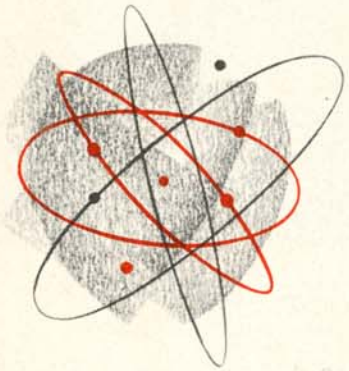
INSTITUTE OF ELECTROTECHNICS

Electricity, Electronics, Power, Radio and Television

Through the Institute of Electrotechnics, the Milwaukee School of Engineering offers instruction in these vocational and technician level courses: Practical Electricity (six months), Electro Technician (12 months), Electronics Technician (12 months), and Radio and Television Technician (18 months). Upon satisfactory completion of either of the three technician curricula, students are eligible to continue their studies in the College, the division of the Milwaukee School of Engineering which offers a Bachelor of Science Degree program in electrical engineering — a concentrated 36-month course.

Each of the programs of study in the Institute of Electrotechnics opens the door to a wide field for the young man interested in preparing himself for a solid, fruitful career. The Practical Electricity curriculum — vocational in level — is designed to ready the student for vocational occupations in the electrical industry, ranging from the type of electrician who installs, assembles, repairs and tests fixtures and equipment to the electrical appliance serviceman.

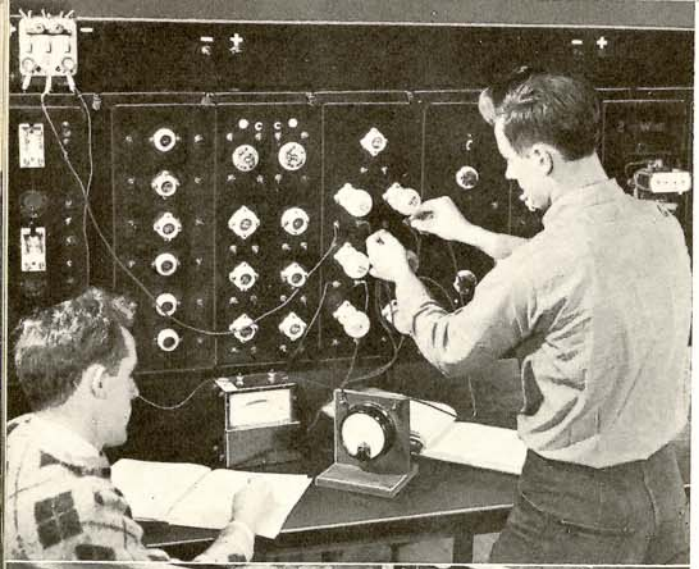
The Electro Technician curriculum serves as both lower division study for students desiring to continue in the College for a Bachelor of Science degree in electrical power, and as a complete course in itself for those who would qualify as skilled technicians in the power field for work in operating and maintenance phases in which there is a great need for such personnel. Occupations for electro technicians include: electrical tester, manufacturing supervisor, service and maintenance man, power house engineer, electrical contractor, salesman and draftsman.



The Electronics Technician curriculum prepares the student for the still young field of electronics, which includes radio broadcasting, sound motion pictures, communications systems and numerous industrial applications of electronics. At the same time, the course is a part of the required study toward the Bachelor of Science degree in electrical engineering, should the student desire to continue his studies in the College. Occupations for electronic technicians include: laboratory man, electrical tester, maintenance technician, contractor, manufacturing supervisor, salesman and trouble shooter.

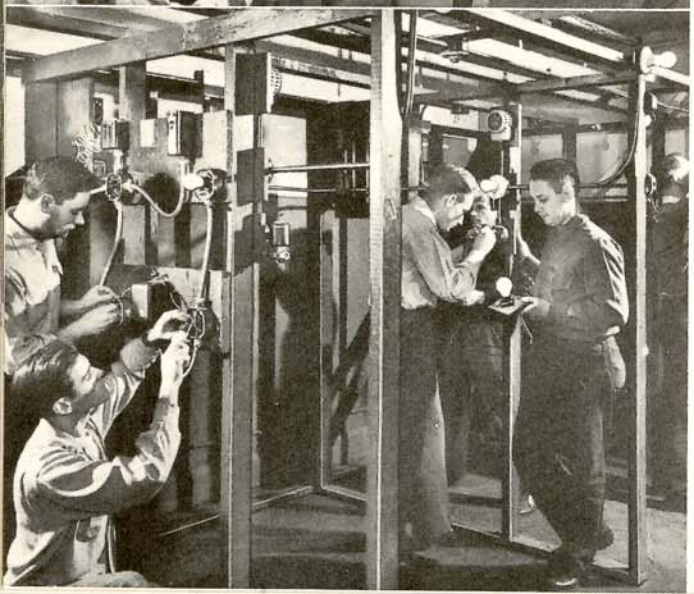
The Radio and Television Technician Course, newest of the programs in this division, is a revision of a course for radio technicians which the School had offered for many years. It features instruction in the servicing of AM, FM and television apparatus and trains students for technician work in the fascinating field of radio and the vast, sprouting television industry. Occupations for radio and television technicians include: radio and/or television serviceman, retailer, assembly supervisor, tester, broadcast radio operator, police, taxicab and railroad transmitter operator, and police, taxicab and railroad receiver serviceman. Upon completion of this course, the student may enter industry as a qualified technician or continue in the College to complete work for a Bachelor's degree in electrical engineering with a major in electronics, in 24 additional months.

This overall laboratory view shows students measuring the volt-ampere characteristics of resistors to determine the temperature coefficients of various conducting materials. *Career Note:* "The world needs men who know something of electricity, of the operation and control of electrical power." — Charles P. Steinmetz, late member, Advisory Council, Milwaukee School of Engineering.



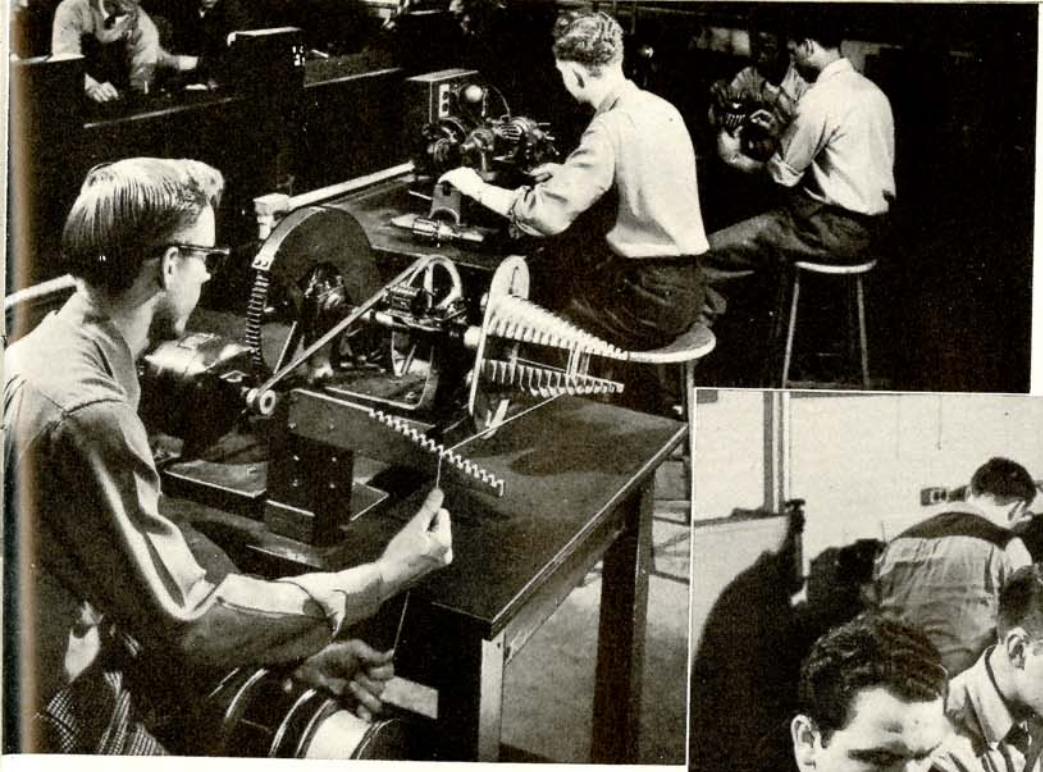
Practical experience gained during the first terms provide a foundation upon which students are able to understand the theoretical training of advanced electricity. Here students are using a unit test board to determine measurements of resistance in series and in parallel. *Career Note:* Electricity, harnessed and put to work in a multitude of ways, has changed — and made more attractive — the face of civilization. Despite a half century of progress, its development has just begun.

The calibration of a voltmeter is the subject of the experiment being undertaken by these electricity students. Such experiments help the student understand the fundamental laws of electricity.



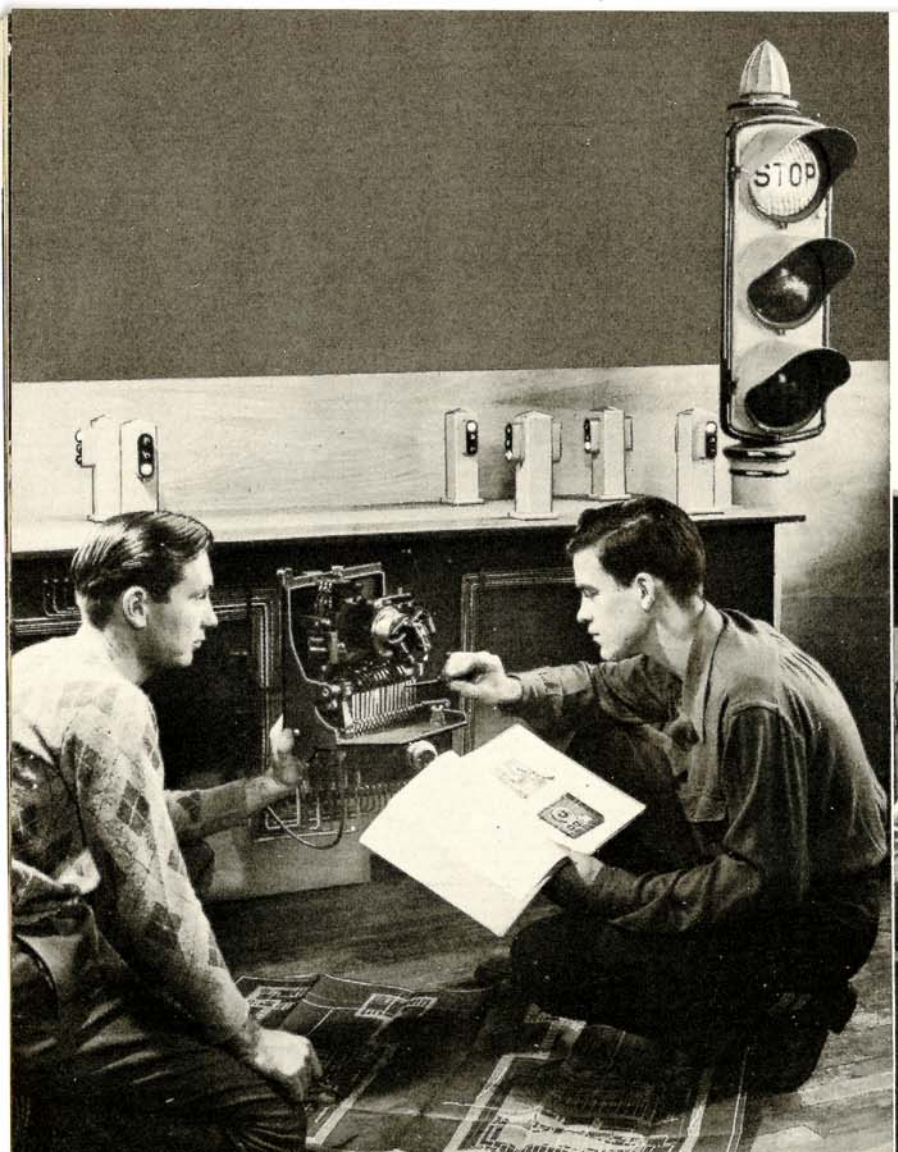
Practical Electricity students at work in a laboratory session, installing electrical outlets, switches and control units under conditions simulating new building construction. *Career Note:* Without the power of electricity through its many applications, today's fast moving pace of technical achievement would be impossible.

The testing and checking circuits of an automatic fence-charging device are the subject of this experiment in practical electricity. Students use a mock-up board to perform the test. *Career Note:* America's vast electrical industries require skilled manpower. There is a need—even in the small communities—for mechanics with a thorough knowledge of applied electricity.



In the foreground, a student in the fractional horsepower laboratory winds a coil to be placed on the armature of an electric motor. In the center, a student resurfaces a commutator, while in the background an armature is being rewound. *Career Note:* The annual market for power equipment and supplies is $2 billion.

Students in both the refrigeration and practical electricity curricula take courses in the fractional horsepower laboratory. Here a group is working on fractional horsepower armatures. Various stages of the rewinding process are shown. *Career Note:* The total of privately owned plant construction earmarked for completion between July 1947 and January 1951 will amount to 16,000,000 kw. in new electric generating capacity for U. S. Total capacity operation output will require $5 billion.



A model traffic signal system is used in this experiment to check for continuity, to study the circuits and to learn the operating characteristics of the various mechanisms.

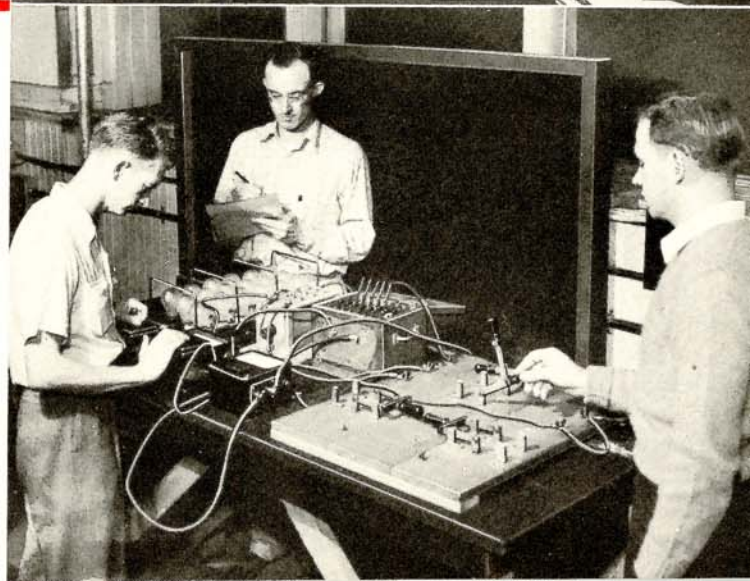
Traffic light equipment is used by students who are performing an experiment on servicing such equipment. The model was donated to the School by the City of Milwaukee and is a replica of the city's traffic control system. *Career Note:* The broad electrical industry still has need of men of vision and courage to keep pace with its rapid developments and to enable the public to profit by the application of new discoveries.

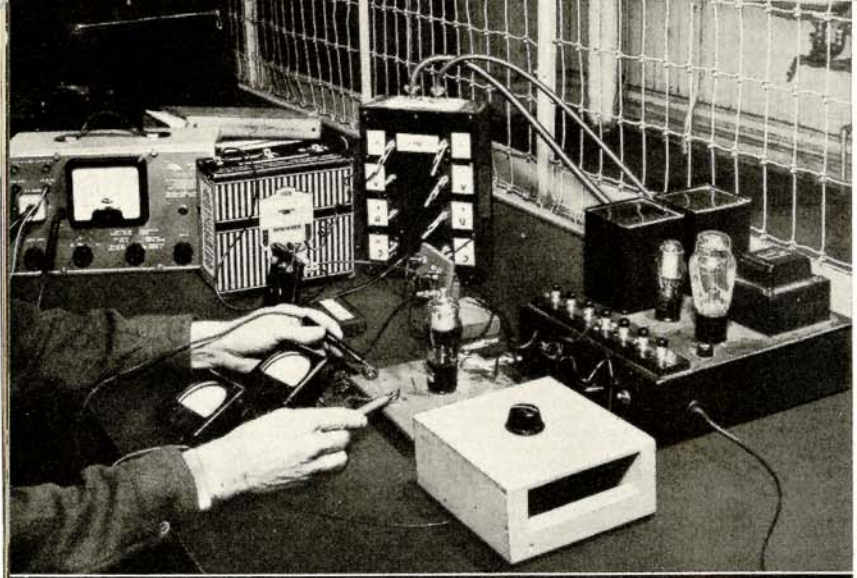
Under the guidance of an instructor, this student measures characteristics of 220-110 volt transformers in the Milwaukee School of Engineering's A-C testing laboratory. *Career Note:* Power is the common physical denominator of modern civilization.

The instruments on the table in this photo are galvanometers, very delicate devices used for detecting and measuring feeble electric currents. They are being used with a Wheatstone Bridge, an apparatus for the measurement of resistance. *Career Note:* Behind America's huge production capacity is one indispensable factor—electrical power.

This experiment in the electrical laboratories is being performed by students to determine the characteristics of a 2,200 volt transmission line. Readings are recorded and used in completing requirements for class reports. *Career Note:* Without power, none of the major advances in science, construction, industry or business would have been possible.

Power, current and voltage in a parallel A-C circuit containing resistance, inductance and capacitance are determined in this experiment in electrical power performed in one of the School laboratories. The Milwaukee School of Engineering has pioneered in electrical instruction since it was founded in 1903. *Career Note:* Manufacturers of electrical power equipment will find a market for all they can deliver for years to come.



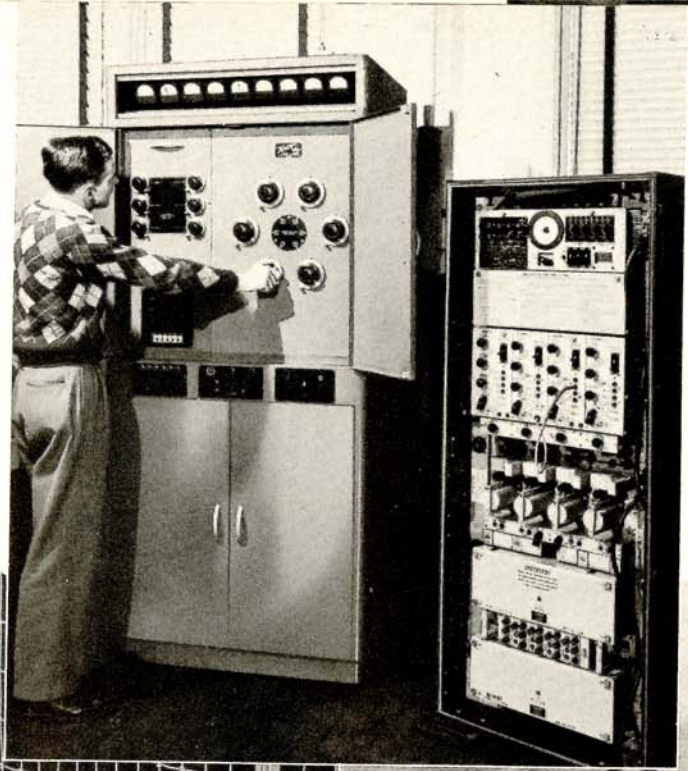


Important in the study of electronics is a knowledge of the triode. Here the student is obtaining the plate characteristics of a high vacuum triode, to determine the characteristics of the tube. *Career Note:* National Association of Broadcasters estimated the U. S. had 37,600,000 families in 1947, of whom 35,000,000, or 93 per cent, had radios.

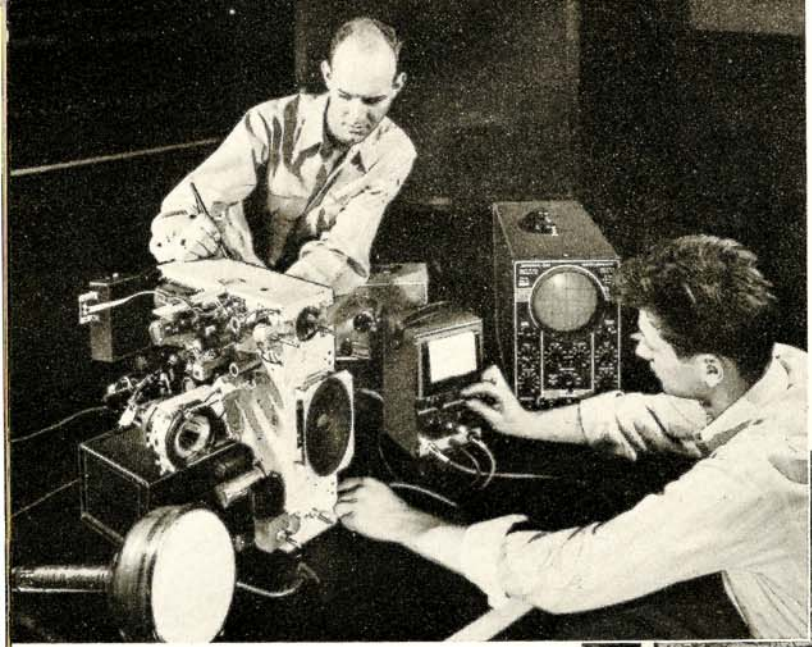
This graphic radio demonstrator board and accompanying equipment are used by an instructor to teach radio receiver alignment to a class of electronics students. *Career Note:* Radio Manufacturers' Association reported 1947 output of radios at 18,500,000 sets compared to 15,000,000 in '46. Large majority were AM, but FM production had reached 1,175,104 sets, compared to 181,000 in 1946.

Worth observing is this display of test boards consisting of a rectifier, inverter and an electronic wattmeter — equipment used in their laboratory work by electronics students in the School. *Career Note:* Automotive operation of machinery and processing operations, automatic inspection, and aids to safety and to an uncountable number of other operations, establish the much publicized fact that this is the electronic age.

A one-kilowatt transmitter, at left, is adjusted by a student in one of the laboratories. At right is a four channel teletype terminal station. *Career Note:* Within the next few years, the Federal Communications Commission predicts there will be greatly increased traffic in radio spectrum, which has exploded from its pre-war 300,000 kilocycles to today's 30,000,000 kilocycles. The Commission estimates that hundreds of thousands of additional channels will be licensed in TV, FM, radar, aviation and railroad radar, automotive communications, machine applications, amateur operations, municipal services, citizen walkie-talkies, diathermy, etc.

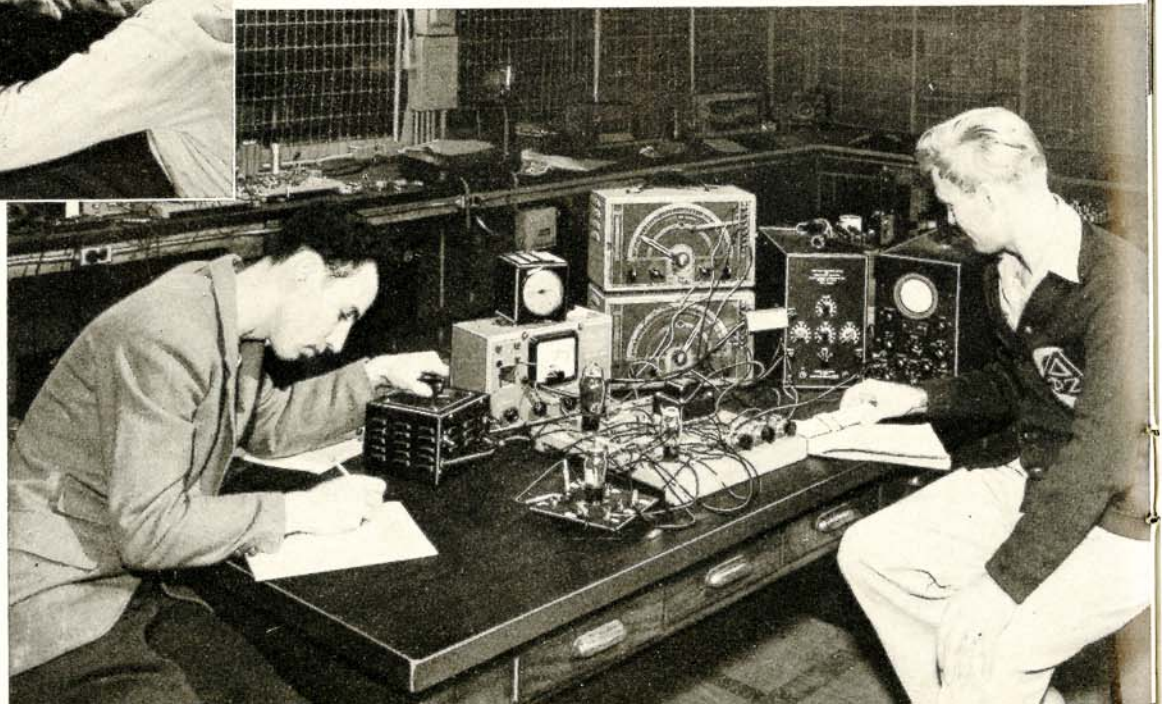


A radio frequency amplifier, an audio frequency amplifier, and a radio frequency detector are included in this display of electronic equipment in the electronics laboratory. These three circuits represent the three main sections of a radio receiving set in its most elementary form. *Career Note:* Electronics is that horizontal group of more than 20 industries devoted to radio, communication, and the industrial applications of electron tubes.



The video and audio channels of a television receiver are aligned by these students in the Milwaukee School of Engineering television laboratory. *Career Note:* "If trained workers were ever needed in any field, television, in all probability, exceeds them all." — Milton Cross in Achievement magazine.

Television students are shown at work in the modern television laboratory aligning and testing several makes of video receivers. *Career Note:* It is expected that 2,000,000 television receivers will be produced during 1949, thus upping previous estimates of 1,600,000. Some say 2,000,000 is a conservative figure.



Electronics students are shown here testing the frequency, phase and non-linear distortion of electronic amplifier stages, one of a number of experiments in the Milwaukee School of Engineering electronics curricula. *Career Note:* Electronics has extensive applications in 28 major industries ranging from air transportation to woodworking.

LITHO IN U. S. A.